

9 February 1965

TO : Those Concerned

FROM : [REDACTED] 25X1A5a1

SUBJECT : Inspection of 16V-71 Engines Operating at [REDACTED] Communications Stations [REDACTED] 25X1C4d 25X1A6a

FOREWORD

The purpose of the trip was to investigate causes of top compression ring (fire ring) breakage in the subject engines and to recommend corrective action.

The writer visited [REDACTED] prior to arriving in [REDACTED] and inspected one 16V-71 engine running at a [REDACTED] there in addition to discussing available Diesel fuels with a Quality Control agent in the [REDACTED] office there.

The writer arrived in [REDACTED] on 1-28-65 and spent 7 days at the [REDACTED] sites before leaving on 2-10-65.

CONCLUSIONS

1. An inspection of six left bank cylinders of engine 16VA-586 showed more than normal fire ring face wear at 2700 hours. Samples of the Esso fuel and [REDACTED] lube oil were returned [REDACTED] for analysis.

2. High sulfur content and a high final boiling point are common in Diesel fuels being refined from the Near East crudes used by U.S. Govt. forces in the [REDACTED] area.

1. Fire ring breakage results from a drastic reduction in ring cross section due to abnormal ring face wear.

2. The abnormal wear is typical of that obtained from the corrosive attack obtained with fuels having high sulfur content. The condition of the cylinder liners indicates the same type of wear.

3. The writer found no operating or maintenance procedures during his visit that were considered significant contributors to the top ring wear.

4. The engine airbox fouling is probably attributed to the high final boiling point (over 700° F) of the fuel being used.

5. Based on the inspection of the one engine disassembled during the writer's visit the Mobil Delvac S-230 oil being used is doing an adequate job with none of the undesirable effects sometimes noted with Series 3 oils.

6. Although not a contributor to the current fire ring failures, the conditions under which the engines are operating can be improved upon and the conditions under which they are being overhauled must be improved upon.

#### RECOMMENDATIONS

1. If the fuel analysis indicates over 0.5% sulfur, change the fuel per our recommendations for [REDACTED] later in the report.

2. Have lube oil analysis run to determine if the current 300-hr change interval is adequate.

3. Pipe crankcase breather fumes down through the van deck and install the standard Farr precleaners and aspirators on all engine air cleaners.

4. Lower the fuel supply tank so that the full tank level is approximately 1 foot below the injector tips.

1. Change fuel immediately to one meeting the following recommendations for generator set use:

90% Boiling point	- - - - -	550° Max.
Final	- - - - -	600° Max.
Cetane No.	- - - - -	40 Min.
Sulfur Content	- - - - -	0.5% Max.

25X1A5a1 (The current supplier, Mobil, has proposed a dual purpose parosene, VV-K-211-B, which [REDACTED] has approved, or a JP-1 fuel, DMRD 2494 Issue No. 3 which [REDACTED] has not formally approved as of 2-9-65).

2. If a fuel meeting the above specifications is obtained, change to a Supplement 1 lube oil and establish the change interval with the supplier.

3. Install 90 degree sweep elbows on all muffler outlets to direct the exhaust upward instead of horizontally. This will eliminate the exhaust recirculation and radiator fouling currently being experienced.

4. Make provisions to readily remove any engine from the vans and place it in a shop building for rebuild. In addition to the working conditions in the vans being poor, the amount of airborne dirt that could accumulate in a disassembled engine during the dusty summer months could significantly lower engine life after rebuild.

If the mobility of the vans is no longer of prime importance, the installation of the engines in a building with provisions for quick engine change might be the best solution. The current cooling and exhaust recirculation problems would also be eliminated.

5. Lower day tanks at both the Receiver and Transmitter sites approximately 4 ft. to prevent a positive head of fuel on the injectors. A larger day tank would be desirable at the Transmitter site, and the recommendations in the Fuel Systems bulletin left with [REDACTED] should be followed. 25X1C4d

6. For maximum engine life, these sets should not be operated continuously in excess of 280 KW output.

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